Sub D2

1. (Amended) A method for controlling hydrocarbon injection into an engine exhaust to reduce NOx, comprising:

injecting the hydrocarbon into the engine exhaust in accordance with detection of a light-off event, such light-off event being detected when there is a hydrocarbon-oxygen reaction wherein an exothermic reaction is produced and detected.

4. A method for controlling hydrocarbon injection into an engine exhaust to reduce NOx in such exhaust, such engine exhaust with the NOx and the injected hydrocarbon being directed to a catalyst for reaction therein, comprising:

(a) detecting an exothermic reaction across the catalyst; and

(b) detecting a temperature of an output of the catalyst in response to the detected exothermic reaction; and

(c) injecting the hydrocarbon into the reaction in accordance with the detected temperature.

5. A method for controlling hydrocarbon injection into an engine exhaust to reduce NOx in such exhaust, such engine exhaust with the NOx and the injected hydrocarbon being directed to a catalyst for reaction therein, comprising:

(a) detecting a temperature difference across the catalyst;

(b) comparing the temperature difference with a predetermined temperature threshold;

(c) determining an exothermic condition temperature at an output of the catalyst when the temperature difference is determined to exceed the threshold;

(d) comparing the determined exothermic condition temperature with an exothermic condition temperature expected from the catalyst at a time prior to the determined exothermic condition temperature; and

(e) modifying the injected hydrocarbon in accordance with said last-mentioned comparison.

6. A method for determining peak efficiency temperature of a catalyst in reducing NOx wherein such NOx is reduced by reacting such NOx in the catalyst with a hydrocarbon, comprising:

(a) detecting a temperature difference across the catalyst;

(b) comparing the temperature difference with a predetermined temperature threshold;

(c) determining an exothermic condition temperature at an output of the catalyst when the temperature difference is determined to exceed the threshold.

7. A system for controlling hydrocarbon injection into an engine exhaust to reduce NOx in such exhaust, such engine exhaust with the NOx and the injected hydrocarbon being directed to a catalyst for reaction therein, comprising:

(a) a catalyst for facilitating a reaction between the injected hydrocarbon and NO_x in the exhaust;

(b) a hydrocarbon injector for injecting the hydrocarbon into the exhaust upstream of the catalyst;

(c) a detecting system comprising:

a pair of sensors each detecting a common parameter in the exhaust, one of such sensors being upstream of the catalyst and the other one of the sensors being downstream of the first sensor; and

a processor for controlling the hydrocarbon injector in response to the pair of sensors, such processor being programmed to:

compare a difference in the common parameter detected by the pair of sensors with a predetermined threshold;

determine an exothermic condition at an output of the catalyst when the difference in the common parameter is determined to exceed the threshold;

compare the determined exothermic condition with an exothermic condition expected from the catalyst at a time prior to the determined exothermic condition; and

modify the injected hydrocarbon in accordance with said last-mentioned comparison.

8. The system recited in claim 7 wherein the common parameter is temperature and wherein the sensors are temperature sensors.

9. A processor for controlling hydrocarbon injection into an engine exhaust to reduce NOx in such exhaust, such engine exhaust with the NOx and the injected hydrocarbon being directed to a catalyst to facilitate reaction between the injected hydrocarbon and the exhaust NOx, such processor being programmed to:
provide a control signal to a hydrocarbon injector to inject the hydrocarbon into the exhaust upstream in response to output signal from a pair of sensors, each of the pair of sensors being adapted detecting a common parameter in the exhaust, one of such sensors being upstream of the catalyst and the other one of the sensors being downstream of the first sensor, such control signal being provided by steps comprising:

comparing a difference in the common parameter detected by the pair of sensors with a predetermined threshold;

determining an exothermic condition at an output of the catalyst when the difference in the common parameter is determined to exceed the threshold;

comparing the determined exothermic condition with an exothermic condition expected from the catalyst at a time prior to the determined exothermic condition; and

modifying the injected hydrocarbon in accordance with said last-mentioned comparing.

10. A method for controlling hydrocarbon injection into an engine exhaust to reduce NOx in such exhaust, such engine exhaust with the NOx and the injected hydrocarbon being directed to a catalyst for reaction therein, comprising:

comparing a difference in a common parameter detected by a pair of sensors with a predetermined threshold, one of such sensors being upstream of the catalyst and the other one of the sensors being downstream of the first sensor;

determining an exothermic condition at an output of the catalyst when the difference in the common parameter is determined to exceed the threshold;

comparing the determined exothermic condition with an exothermic condition expected from the catalyst at a time prior to the determined exothermic condition; and

modifying the injected hydrocarbon in accordance with said last-mentioned comparison.

11. The method recited in claim 10 wherein the common parameter is temperature and wherein the sensors are temperature sensors.

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12. (NEW) A method for controlling hydrocarbon injection into an engine exhaust to reduce NOx in such exhaust, such engine exhaust with the NOx and the injected hydrocarbon being directed to a catalyst for reaction therein, comprising:

(a) detecting an exothermic reaction across the catalyst; and

(b) measuring a temperature of an output of the catalyst in response to the detected exothermic reaction; and

(c) injecting the hydrocarbon into the reaction in accordance with the detected temperature.

13. (NEW) A method for determining peak efficiency temperature of a catalyst in reducing NOx wherein such NOx is reduced by reacting such NOx in the catalyst with a hydrocarbon, comprising: